CLAIMS

1. A method of forming electroplated solder on an organic circuit board for making flip chip joints and board to board solder joints, comprising:

providing an organic circuit board including a surface bearing electrical circuitry that includes at least one contact pad;

a solder mask layer that is placed on said board surface and patterned to expose said pad;

a thin metal layer that is deposited by physical vapor deposition method over said board surface;

a resist layer with at least one opening located at said pad that is deposited over said thin metal layer;

a solder material that is formed in said opening by electroplating;

said resist layer and said thin metal layer beneath said resist layer being removed.

2. The method of claim 1, wherein said thin metal layer is made of a metal selected from the group consisting of copper, tin, and tin-lead alloy.

3. The method of claim 1, wherein said thin metal layer is a form of multilayer structure made of metals selected from the group consisting of copper, tin, nickel, chromium, titanium, copper-chromium alloy, and tin-lead alloy.

4. The method of claim 1, wherein the thickness of said thin metal layer is less than 0.005 millimeter.

5. The method of claim 1, wherein said solder material is an alloy made by the mixture of the elements selected from the group consisting of lead, tin, silver, copper, bismuth, antimony, zinc, nickel, aluminum, magnesium, indium, tellurium, and gallium.

6. A method of forming electroplated solder on an organic circuit board for making flip chip joints and board to board solder joints, comprising:

providing an organic circuit board including a surface bearing electrical circuitry that includes at least one contact pad;

a solder mask layer that is placed on said board surface and patterned to expose said pad;

a thin metal layer that is deposited by chemical vapor deposition method over said board surface;

a resist layer with at least one opening located at said pad that is deposited over said thin metal layer;

a solder material that is formed in said opening by electroplating;

said resist layer and said thin metal layer beneath said resist layer being removed.

7. The method of claim 6, wherein said thin metal layer is made of a metal selected from the group consisting of copper, tin, and tin-lead alloy.

8. The method of claim 6, wherein said thin metal layer is a form of multilayer structure made of metals selected from the group consisting of copper, tin, nickel, chromium, titanium, copper-chromium alloy, and tin-lead alloy.

9. The method of claim 6, wherein the thickness of said thin metal layer is less than 0.005 millimeter.

10. The method of claim 6, wherein said solder material is an alloy made by the mixture of the elements selected from the group consisting of lead, tin, silver, copper, bismuth, antimony, zinc, nickel, aluminum, magnesium, indium, tellurium, and gallium.

11. A method of forming electroplated solder on an organic circuit board for making flip chip joints and board to board solder joints, comprising:

an organic circuit board including a surface bearing electrical circuitry that includes at least one contact pad;

a solder mask layer that is placed on said board surface and patterned to expose said pad;

coating the surfaces of said solder mask layer and said pad with aqueous

solutions which at least contains copper ions followed by reduction of said copper ions to form catalytic copper, wherein there is no reduction of noble metal ions;

a thin metal layer that is deposited by electroless plating over said board surface;

a resist layer with at least one opening located at said pad that is deposited over said thin metal layer;

a solder material that is formed in said opening by electroplating;

said resist layer and said thin metal layer and catalytic copper beneath said resist layer being removed.

12. The method of claim 11, wherein said noble metal is selected from the group consisting of palladium, gold, and silver.

13. The method of claim 11, wherein said thin metal layer is made of a metal selected from the group consisting of copper, tin, and tin-lead alloy.

14. The method of claim 11, wherein said thin metal layer is a form of multilayer structure made of metals selected from the group of copper, tin, nickel, chromium, titanium, copper-chromium alloy, and tin-lead alloy.

15. The method of claim 11, wherein the thickness of said thin metal layer is less than 0.005 millimeter.

16. The method of claim 11, wherein said solder material is an alloy made by the mixture of the elements selected from the group consisting of lead, tin, silver, copper, bismuth, antimony, zinc, nickel, aluminum, magnesium, indium, tellurium, and gallium.

17. A method of forming electroplated solder on an organic circuit board for making flip chip joints and board to board solder joints, comprising:

an organic circuit board including a surface bearing electrical circuitry that includes at least one contact pad;

a solder mask layer that is placed on said board surface and patterned to expose said pad;

coating the surfaces of said solder mask layer and said pad with aqueous

solutions which at least contains copper ions followed by reduction of said copper ions, wherein there is no reduction of noble metal ions;

a first thin metal layer that is deposited by electroless plating over said board surface;

a second thin metal layer that is deposited by electroplating over said thin metal film;

a resist layer with at least one opening located at said pad that is deposited over said second thin metal layer;

a solder material that is formed in said opening by electroplating;

said resist layer and said first and second thin metal layers and catalytic copper beneath said resist layer being removed.

18. The method of claim 17, wherein said noble metal is selected from the group consisting of palladium, gold, and silver.

19. The method of claim 17, wherein said first thin metal layer is made of a metal selected from the group consisting of copper, tin, and tin-lead alloy.

20. The method of claim 17, wherein said thin metal layer is a form of multilayer structure made of metals selected from the group of copper, tin, nickel, chromium, titanium, copper-chromium alloy, and tin-lead alloy.

21. The method of claim 17, wherein said second thin metal layer is made of a metal selected from the group consisting of copper, tin, and nickel.

22. The method of claim 17, wherein the total thickness of said first and second thin metal layers is less than 0.005 millimeter.

23. The method of claim 17, wherein said solder material is an alloy made by the mixture of the elements selected from the group consisting of lead, tin, silver, copper, bismuth, antimony, zinc, nickel, aluminum, magnesium, indium, tellurium, and gallium.